1. A method of controlling an optical signal, comprising the steps of:

   (a) determining at least one actual beat frequency derived from a superposition of at least one optical reference signal with the optical signal having an actual frequency, and

   (b) using the at least one actual beat frequency in order to control the actual frequency.

2. The method of claim 1, comprising a step of:

   providing a comb of optical reference signals, preferably controlled by an electrical master clock signal.

3. The method of claim 1,

   wherein step comprises a step of controlling the actual frequency by at least substantially matching the at least one actual beat frequency with at least one target beat frequency.

4. The method of claim 1,

   wherein the at least one target beat frequency is determined by a superposition of the at least one optical reference signal with a target frequency of the optical signal.

5. The method of claim 1, further comprising:

   prior to step a step of adjusting the actual frequency to be in a predetermined frequency range.

6. The method of claim 1,

   wherein the predetermined frequency range of the actual frequency

covers a frequency of at least one of the at least one optical reference signal.

7. The method of claim 1, further comprising the steps of:

preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it to avoid a saturation of a detector detecting the optical signal.

8. The method of claim 1, further comprising the steps of:

preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it, the predetermined bandwidth covering the actual frequency of the optical signal and at least one of the optical reference signals to determine the position of the optical signal relative to the at least one optical reference signal.

9. The method of claim 1, further comprising the steps of:

preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it, the predetermined bandwidth covering the actual frequency of the optical signal, the filter characteristic of the preselection being asymmetric with respect to the actual frequency of the optical signal.

10. The method of claim 1, further comprising the steps of:

separately predetermining the actual frequency of the optical signal,

preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it, the predetermined bandwidth covering the predetermined actual frequency of the optical signal, the filter characteristic of the preselector being asymmetric with respect to the predetermined actual frequency of the

optical signal.

11. The method of claim 1, further comprising the steps of:

determining the beat frequencies of at least two, preferably at least three, interference signals generated by the superposition of the optical reference signals with the optical signal,

evaluating a deviation value by comparing the detected actual beat frequencies of the interference signals with the target beat frequencies, the deviation value indicating a mismatch, if any, between the target beat frequencies and the actual beat frequency,

evaluating the sign of the deviation value on the basis of the detected at least two, preferably the at least three, actual beat frequencies of the interference signals.

12. The method of claim 1, further comprising the steps of:

correcting the actual beat frequency of the superimposed signal to the target frequency by using the deviation value, when the deviation value is indicating a mismatch between the target frequency and the actual frequency of the optical signal.

13. The method of claim 1, further comprising the steps of:

evaluating the sign of the deviation value on the basis of the detected beat frequencies of the superimposed signal by comparing the at least two actual beat frequencies with at least two target beat frequencies provided by at least two electrical oscillator signals.

14. The method of claim 13, further comprising the steps of:

comparing the at least two actual beat frequencies with the at least two actual beat frequencies by mixing the at least two actual beat

frequencies with the at least two electrical oscillator signals.

15. The method of claim 2, further comprising the steps of:

wherein the frequency distance between each adjacent optical reference signal of the comb is determined by mode-locking the optical reference signals to the master clock signal.

16. The method of claim 2, further comprising the steps of:

locking the comb to an absolute optical frequency reference by locking at least one of the optical reference signals of the comb to the absolute optical frequency reference preferably by means of a phase locked loop.

17. The method of claim 16, further comprising the steps of:

superimposing at least two of the optical reference signals of the comb with the optical signal to create at least two interference signals having actual beat frequencies,

evaluating the sign of the deviation value on the basis of the detected at least two actual beat frequencies by comparing the at least two actual beat frequencies with at least two target beat frequencies provided by at least two electrical oscillator signals,

comparing the at least two actual beat frequencies with the at least two target beat frequencies by mixing the at least two actual beat frequencies with the at least two electrical oscillator signals each having a target beat frequency.

18. The method of claim 17, further comprising the steps of determining the target beat frequencies according to the following scheme:

PFk=|F0-FN|, and

PFk being the target beat frequency of the kth electrical oscillator signal 11a, 11b, 11c, k being 1, 2, 3,..., F0 being the target frequency of the optical signal 2, FN=Fref+N*Fm, FN being the Nth optical signal line of the reference comb away from the absolute optical reference line Fref, Fm being the frequency of the electrical master clock signal 6 and Fref being the frequency of the absolute optical frequency reference 16.

19. The method of claim 1, further comprising the steps of:

providing an error signal for at least three of the actual beat frequencies,

feeding at least three of the error signals into a respective loop filter,

combining the loop filtered error signals with a positive or negative sign according to the following scheme:

for three loop filtered error signals the sign of each error signal changes every 3/2Fm,

for the at least three target beat frequencies of the at least three electrical oscillator signals PFk a sign change of the error signals occurs every 0.5Fm, and

for one of the error signals every 0.5Fm the sign changes, whereby the sign change is recursive every 3/2Fm, and

Fm being the frequency of the electrical master clock signal, PFk being the target beat frequency of the kth electrical oscillator signal, k being 1, 2, 3,....

20. The method of claim 1, further comprising the steps of:

filtering at least two, preferably three, actual beat frequencies within a predetermined bandwidth,

the predetermined bandwidth covering the actual frequency of the optical signal,

detecting at least two, preferably at least three, actual beat frequencies of a superposition of the optical reference signals of the comb with the optical signal,

evaluating a deviation value by comparing the detected actual beat frequencies with the target beat frequencies to detect a mismatch, if any, between the target beat frequencies and the actual beat frequencies.

21. The method of claim 1,

wherein the filter characteristic of the preselector is asymmetric with respect to the actual frequency of the optical signal,

further comprising the step of detecting an intensity difference, if any, between the signals of the actual beat frequencies, to evaluate a tuning direction of the optical signal when tuning the optical signal and/or to evaluate a sign of the mismatch.

22. A method of providing an optical signal, comprising the steps of:

providing at least one optical reference signal,

providing the optical signal having an actual frequency,

superimposing the at least one optical reference signal with the optical signal,

executing the method of claim 1 for controlling the actual frequency of the optical signal.

23. A system for controlling an optical signal, comprising the steps of:

a determining unit adapted for determining at least one actual beat frequency derived from a superposition of at least one optical reference signal with the optical signal having an actual frequency, and

a controller adapted for using the at least one actual beat frequency in order to control the actual frequency.

24. The system of claim 23, further comprising at least one of:

a reference signal source adapted for providing at least one optical reference signal,

a signal source adapted for providing the optical signal having an actual frequency,

a superimposing unit adapted for superimposing the at least one optical reference signal with the optical signal,

a preselector adapted for preselecting the superimposed signal comprising the at least one actual beat frequency within a predetermined bandwidth before detecting it.